

# PATENT ABSTRACTS OF JAPAN

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(71)Applicant : DAINIPPON PRINTING CO LTD

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(72)Inventor : TSURUOKA YOSHIAKI

KIMURA KUNIAKI

AICHI MAKOTO

TAKEMOTO JUN

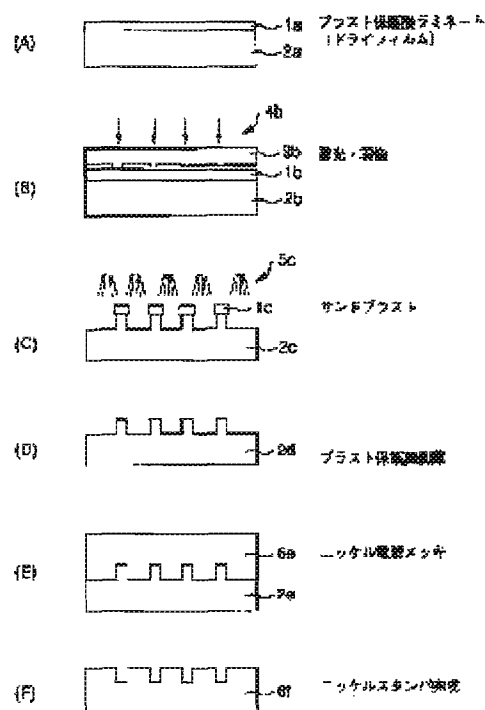
OHASHI YOICHIRO

## (54) BARRIER RIB MOLD FORMING METHOD AND BARRIER RIB MOLD MATERIAL

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To manufacture a master mold having a precise shape and a large area with high precision and at low cost without causing a defect by forming a sand blast protection film having a pattern in a vertex part of a barrier rib mold and peeling it after a sand blasting process.

**SOLUTION:** A sand blast protection film 1a is stuck on a barrier rib mold material 2a, a diaphragm pattern mask 3b adheres closely to a sand blast protection film 1b, and light 4b is applied thereon. Only the sand blast protection film 1b corresponding to a vertex part of a diaphragm remains through the development. When the sand blasting is done, a barrier rib mold material 2c is scraped off in a part having no sand blast protection film 1c, and the same shape as a barrier rib is formed. Since the material in which an easy digging material layer and a hard digging material layer for sand blast are laminated is used as the barrier rib mold material 2c, it is possible to obtain extremely high precision concerning with a height of the barrier rib. When the sand blast protection film 1c is peeled from the barrier rib mold material 2c, a barrier rib mold material 2d becomes a master mold for plasma display.



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## CLAIMS

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[Claim(s)]

[Claim 1]A septum type formation method comprising:

Protective film morphosis which forms in the surface of a septum mold material a sandblasting protective film which has a pattern corresponding to a septum type apex part.

A sandblast treatment process in which a septum mold material of the surface in which sandblast treatment is performed to the surface of a side which has said sandblasting protective film of said septum mold material, and said sandblasting protective film is not formed is shaved off and investigated, A protective film exfoliation process in which exfoliate said sandblasting protective film from said septum mold material board, and a die member is obtained.

[Claim 2]A septum type formation method having the Mother type morphosis which forms the Mother type which uses said die member as a master mold, inserts each other in with the master mold in the septum type formation method according to claim 1, and has shape by performing electroplating to said master mold.

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## DETAILED DESCRIPTION

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### [Detailed Description of the Invention]

[0001]

[Field of the Invention]This invention belongs to the technical field of a plasma display panel (PDP is used together as an abbreviation). inserting each other in with the septum used when forming a septum in the back plate of a plasma display panel with transfer or an allocated type especially -- \*\* -- it is related with the septum mold material which is a base material of a septum type formation method and a die member which forms the die member which has shape.

[0002]

[Description of the Prior Art]inserting each other in with a septum -- \*\* -- the formation method which transfers the rib paste with which the mold sheet of shape was filled up to a glass substrate, and forms a septum is proposed. For example, to JP,8-273537,A. Manufacturing a mold sheet (Mother type) using an intaglio (master mold), filling up the sheet crevice of the mold sheet with rib paste, exfoliating after sticking the mold sheet to a glass substrate, and transferring rib paste on the surface of a glass substrate is indicated. moreover -- inserting each other in with a septum -- \*\* -- the method of welding by pressure and carrying out the allocated type of the rib paste applied to the glass substrate using the mold sheet of shape is proposed. For example, rib paste was applied to the glass substrate surface, after welding a mold sheet by pressure to the spreading side, the mold sheet was exfoliated, the allocated type of the rib paste was carried out to partition shape, and the account can appear the manufacturing method of the septum which calcinates the rib paste by which the allocated type was carried out in JP,8-273538,A.

[0003]

[Problem(s) to be Solved by the Invention]In the formation method of such a septum, the mold sheets of a large area are foreign matter adhesion, poor exfoliation, and consumable goods that are easy to receive damage by \*\* in precision shape. Therefore, in the above-mentioned example, manufacturing with shaping the mold sheet of the quantity needed using the intaglio which has the shape equivalent to the shape of a septum is performed. In this case, an intaglio is a master mold and a mold sheet is the Mother type. Naturally, this master mold has a large area in precision shape. Therefore, in

machinery cutting by fraise, an engraver, etc., master mold defect-free and highly precise manufacture is very difficult, and further very expensive.

[0004]Then, the purpose of this invention is to provide the septum type formation method which can manufacture the master mold which has a large area in precision shape by low cost with high precision [ it is defect-free and ], and a septum mold material suitable for the master mold base material.

[0005]

[Means for Solving the Problem]The above-mentioned purpose is attained by following this invention. Namely, a septum type formation method of the 1st gestalt of this invention, Protective film morphosis which forms in the surface of a septum mold material a sandblasting protective film which has a pattern corresponding to a septum type apex part, A sandblast treatment process in which a septum mold material of the surface in which sandblast treatment is performed to the surface of a side which has said sandblasting protective film of said septum mold material, and said sandblasting protective film is not formed is shaved off and investigated, It is made to have a protective film exfoliation process in which exfoliate said sandblasting protective film from said septum mold material board, and a die member is obtained.

[0006]According to the septum type formation method of this invention, a sandblasting protective film which has a pattern corresponding to a septum type apex part by protective film morphosis is formed in the surface of a septum mold material, Sandblast treatment is performed to the surface of a side which has said sandblasting protective film of said septum mold material by a sandblast treatment process, a septum mold material of the surface in which said sandblasting protective film is not formed is shaved off, and it is investigated, Said sandblasting protective film exfoliates from said septum mold material board by a protective film exfoliation process, and a die member is obtained. That is, the sandblasting protective film can form a pattern of precision shape corresponding to a septum type apex part. The sandblast treatment can leave a portion of a sandblasting protective film faithfully, can shave off a septum mold material, and, moreover, can process a large area. Therefore, a master mold which has a large area in precision shape can be manufactured by low cost with high precision [ it is defect-free and ].

[0007]A septum type formation method of the 2nd gestalt of this invention, Said die member is used as a master mold, and it is made to have the Mother type morphosis which forms the Mother type which inserts each other in with the master mold, and has shape by performing electroplating to said master mold in a septum type formation method of the 1st gestalt. According to the septum type formation method of this invention, the Mother type which comprises metallic materials, such as nickel which has intensity and endurance by the Mother type morphosis, can be obtained from a master mold.

[0008]A septum type formation method of the 3rd gestalt of this invention, In a septum type formation method of a gestalt of the 1st or 2, said septum mold material, An easily drillable material layer which can shave off easily by said sandblast treatment and has the predetermined thickness corresponding to height of a septum, It has the composition which laminated a difficulty drilling material layer which

cannot be shaved off easily, and is made to perform said sandblast treatment by said sandblast treatment to the near surface of said easily drillable material layer. According to the septum type formation method of this invention, in an easily drillable material layer of a septum mold material, it is efficiently shaved off by sandblast treatment. And if it reaches to a difficulty drilling material layer laminated in a lower layer, efficiency shaved off in there can fall and can make advance a halt condition substantially. Thickness of an easily drillable material layer has the predetermined thickness corresponding to height of a septum. Therefore, accuracy whose die member obtained is very high about a predetermined size corresponding to height of a septum is obtained. Predetermined thickness (size) corresponding to height of a septum is thickness (size) obtained by performing adding thickness of a predetermined layer (for example, dielectric layer) to the height of a predetermined septum itself, or height of a predetermined septum etc. here.

[0009]It is made for a septum mold material of this invention to have the composition which laminated an easily drillable material layer which can shave off easily by sandblast treatment and has the prescribed thickness corresponding to height of a septum, and a difficulty drilling material layer which cannot be easily shaved off by said sandblast treatment. According to the septum mold material of this invention, accuracy whose die member obtained by sandblast treatment is very high about a predetermined size corresponding to height of a septum is obtained.

[0010]

[Embodiment of the Invention]Next, an embodiment explains this invention. The septum type morphosis in this invention is shown in drawing 1. As for a septum pattern mask and 4b, in drawing 1, a sandblasting protective film, 2a, 2b, and 2c, 2d and 2e are [ 1a, 1b, and 1c / a septum mold material and 3b / sandblasting and 6e and 6f of light and 5c ] metal skins. The step of the beginning of the septum type morphosis is a protective film attachment process. In this protective film attachment process, the sandblasting protective film 1a is stuck and stuck to the septum mold material 2a. The state where the sandblasting protective film 1a was stuck and stuck to the septum mold material 2a is shown in drawing 1 (A).

[0011]The following steps are exposure and a developing process. In this exposure and developing process, the septum pattern mask 3b is stuck to the sandblasting protective film 1b stuck and stuck to septum mold material 2b, and it irradiates with the light 4b. In an example shown in drawing 1, the sandblasting protective film 1b is a photo-curing type protective film. That is, the portion into which after development remained and the portion which penetrated the light 4b with the septum pattern mask 3b covered the light 4b with the septum pattern mask 3b is removed by development. The septum pattern mask 3b is a pattern which classifies the apex part and valley part of a septum, an apex part penetrates the light 4b and a valley part covers the light 4b. Therefore, only the sandblasting protective film 1b corresponding to the apex part of a septum remains by development. The septum pattern mask 3b is stuck to the sandblasting protective film 1b, and the state of irradiating with the light 4b is shown in drawing 1 (B).

[0012]The following step is a sandblast treatment process. Detailed abrasives (sand; sand) are made to blow off from a nozzle with compressed air in this sandblast treatment process at high speed to the

surface of the septum mold material 2c of the side which has the patternized sandblasting protective film 1c. In the portion of the surface of the septum mold material 2c which does not have the sandblasting protective film 1c, i.e., the portion used as the valley of a septum, the septum mold material 2c is then shaved off by the impulse force of abrasives. On the other hand, since the impulse force of abrasives is absorbed by the sandblasting protective film 1c in the portion of the surface of the septum mold material 2c which has the sandblasting protective film 1c, i.e., the portion used as the apex part of a septum, the septum mold material 2c is not shaved off. Therefore, the same shape as a septum will be formed in the septum mold material 2c of sandblast treatment.

[0013]At this time, it is considered as the septum mold material which has the composition which laminated the easily drillable material layer which can shave off easily by sandblast treatment and has the predetermined thickness corresponding to the height of a septum as the septum mold material 2c, and the difficulty drilling material layer which cannot be easily shaved off by said sandblast treatment. In that case, in the easily drillable material layer of a septum mold material, it is efficiently shaved off by sandblast treatment. And if it reaches to the difficulty drilling material layer laminated in the lower layer, the efficiency shaved off in there can fall and can make advance a halt condition substantially. Therefore, the die member obtained can obtain accuracy very high about the predetermined size corresponding to the height of a septum. The state of performing sandblast treatment to the surface of the septum mold material 2c of the side which has the patternized sandblasting protective film 1c is shown in drawing 1 (C).

[0014]Soda glass, aluminum, brass, and ceramics can be used for the septum mold material 2c which comprises a simple substance as a material, for example. An acrylic resin and graphite can be used for the easily drillable material layer of the septum mold material 2c which comprises lamination as a material, for example. Copper and soda glass can be used for a difficulty drilling material layer as a material, for example.

[0015]The following step is a sandblasting protective film exfoliation process. In this sandblasting protective film exfoliation process, a sandblasting protective film exfoliates from the septum mold material 2c. The state that the sandblasting protective film exfoliated and of being the septum mold material 2d is shown in drawing 1 (D). The septum mold material 2d shown in drawing 1 (D) obtained by an above-mentioned step is obtained as a master mold which usually has the same shape as the septum formed in the glass substrate for plasma displays.

[0016]Next, the process in which the Mother type is obtained from this master mold is explained. The Mother type is an actually used die member, when performing transfer or an allocated type to a partitioning material and forming a septum in a glass substrate. The first step is a nickel electrolytic plating process. In this nickel electrolytic plating process, a nickel layer is formed on the septum mold material 2d which has partition shape. this nickel layer inserts each other in to the shape which is the septum mold material 2d -- \*\* -- nickel electrolytic plating of sufficient thickness is performed so that it may have shape (concave shape over a convex configuration), namely, so that nickel La Stampa may be obtained. That is, the electrolytic plating performed here is equivalent to what is called electrocasting (electroforming; electroforming). The state where nickel electrolytic plating was

performed and nickel La Stampa 6f was formed in the septum mold material 2e is shown in drawing 1 (E).

[0017]The following step is a nickel La Stampa exfoliation process. In this nickel La Stampa film peeling process, nickel La Stampa 6f exfoliates from the septum mold material 2e. A nickel La Stampa [ which exfoliated from the septum mold material 2e / 6f ] state is shown in drawing 1 (F). nickel La Stampa 6f shown in drawing 1 (F) obtained by an above-mentioned step usually inserts each other in with the septum formed in the glass substrate for plasma displays -- \*\* -- it is obtained as a master mold which has shape.

[0018]Next, an example is explained about the process in which a septum is formed using the above-mentioned master mold obtained by this invention. The process in which a septum is formed using the master mold obtained by this invention is shown in drawing 2 as a mimetic diagram. As for a master mold and 22, in drawing 2, a partitioning material and 24 are glass substrates the Mother type and 23 21. Mother type 22 which inserts each other in to the master mold 21 which has the shape and identical shape of the partitioning material fabricated in order to obtain a septum, and its master mold 21, and has the shape of a relation (concave to a convex shape) is shown in drawing 2 (A) as a mimetic diagram. In drawing 2, (B) ->(C) -> (D) shows the morphosis of the septum by the transfer which uses Mother type 22. In drawing 2, (E) ->(C) -> (D) shows the morphosis of the septum depended on the allocated type which uses Mother type 22.

[0019]First, the morphosis of the septum by transfer is explained. Mother type 22 is filled up with the partitioning material 23 (partitioning material restoration process), and it is made to counter with the glass substrate 24 (counterposing process). Mother type 22 is filled up with the partitioning material 23, and the state where it was made to counter with the glass substrate 24 is shown in drawing 2 (B) as a mimetic diagram. Exhaust air is performed and let the field which Mother type 22 with which the partitioning material 23 was filled up, and the glass substrate 24 accomplish be a vacuum, after making it counter. At this time, exhaust air is performed also in the field of the outsides of Mother type 22 and the glass substrate 24, and it is considered as a vacuum so that it may not change in response to power by the differential pressure of Mother type 22, the atmospheric pressure received from the lateral surface of the glass substrate 24, and the vacuum pressure received from the field of each inside (vacuum process).

[0020]In the state where it became the vacuum, the field of the outside of Mother type 22 and/, or the glass substrate 24 which exhaust air is performed and serves as vacuum pressure is returned to atmospheric pressure. Thereby, Mother type 22 and/, or the glass substrate 24 changes in response to power by the differential pressure of the atmospheric pressure received from the lateral surface, and the vacuum pressure received from an inside field. According to this modification, Mother type 22 and the glass substrate 24 in which it filled up with the partitioning material 23 are stuck (adhesion process). The state where Mother type 22 and the glass substrate 24 in which it filled up with the partitioning material 23 were stuck is shown in drawing 2 (C) as a mimetic diagram. Since this modification is slight, it is slight. [ of modification of Mother type 22 and/, or the glass substrate 24 ] Actual Mother type 22 has the portion or supporting section which absorbs distortion produced

according to modification in the peripheral part of the field where it fills up with the partitioning material 23. The actual glass substrate 24 has the portion or supporting section which absorbs distortion produced according to modification in the peripheral part of the field where the partitioning material 23 is transferred. Therefore, the field of Mother type 22 and/, or the glass substrate 24 which transfers the partitioning material 23 to the glass substrate 24 has not produced distortion in the state where Mother type 22 and the glass substrate 24 were stuck.

[0021]In the state where it stuck, when the partitioning material 23 is the partitioning material 23 of the kind which irradiates with and stiffens ionizing radiation including ionizing radiation hardening resin, it irradiates with ionizing radiation and the partitioning material 23 is stiffened (ionizing radiation exposure process). And while returning the field which Mother type 22 which exhaust air is performed and has become vacuum pressure, and the glass substrate 24 accomplish to atmospheric pressure, the field of the outside of Mother type 22 and/, or the glass substrate 24 returned to atmospheric pressure is exhausted, and it is considered as a vacuum. This exfoliates Mother type 22 and the glass substrate 24 (exfoliation process). The state where Mother type 22 and the glass substrate 24 were exfoliated is shown in drawing 2 (D) as a mimetic diagram. At this time, as shown in drawing 2 (D), Mother type 22 left the partitioning material 23, and has exfoliated from the glass substrate 24, and the partitioning material 23 is transferred to the glass substrate 24.

[0022]Next, the morphosis of the septum depended on an allocated type is explained. Coating of the partitioning material 23 is carried out to the glass substrate 24 (partitioning material coating process), and it is made to counter with Mother type 22 (counterposing process). Coating of the partitioning material 23 is carried out to the glass substrate 24, and the state where it was made to counter with Mother type 22 is shown in drawing 2 (E) as a mimetic diagram. After making it counter, exhaust air is performed and the partitioning material 23 makes a vacuum the field which the glass substrate 24 by which coating was carried out, and Mother type 22 accomplish. At this time, exhaust air is performed also in the field of the outsides of Mother type 22 and the glass substrate 24, and it is considered as a vacuum so that it may not change in response to power by the differential pressure of Mother type 22, the atmospheric pressure received from the lateral surface of the glass substrate 24, and the vacuum pressure received from the field of each inside (vacuum process).

[0023]In the state where it became the vacuum, the field of the outside of Mother type 22 and/, or the glass substrate 24 which exhaust air is performed and serves as vacuum pressure is returned to atmospheric pressure. Thereby, Mother type 22 and/, or the glass substrate 24 changes in response to power by the differential pressure of the atmospheric pressure received from the lateral surface, and the vacuum pressure received from an inside field. According to this modification, Mother type 22 and the partitioning material 23 stick the glass substrate 24 by which coating was carried out (adhesion process). The state where Mother type 22 and the partitioning material 23 stuck the glass substrate 24 by which coating was carried out is shown in drawing 2 (C) as a mimetic diagram. Since this modification is slight, it is slight. [ of modification of Mother type 22 and/, or the glass substrate 24 ] Actual Mother type 22 has the portion or supporting section which absorbs distortion which produces the partitioning material 23 by which coating was carried out to the glass substrate 24



according to modification in the peripheral part of the field which carries out an allocated type. The actual glass substrate 24 has the portion or supporting section which absorbs distortion which the partitioning material 23 produces according to modification in the peripheral part of the field by which an allocated type is carried out. Therefore, the field of Mother type 22 and/, or the glass substrate 24 which carries out the allocated type of the partitioning material 23 by which coating was carried out to the glass substrate 24 has not produced distortion in the state where Mother type 22 and the glass substrate 24 were stuck.

[0024]In the state where it stuck, when the partitioning material 23 is the partitioning material 23 of the kind which irradiates with and stiffens ionizing radiation including ionizing radiation hardening resin, it irradiates with ionizing radiation and the partitioning material 23 is stiffened (ionizing radiation exposure process). And while returning the field which Mother type 22 which exhaust air is performed and has become vacuum pressure, and the glass substrate 24 accomplish to atmospheric pressure, the field of the outside of Mother type 22 and/, or the glass substrate 24 returned to atmospheric pressure is exhausted, and it is considered as a vacuum. This exfoliates Mother type 22 and the glass substrate 24 (exfoliation process). The state where Mother type 22 and the glass substrate 24 were exfoliated is shown in drawing 2 (D) as a mimetic diagram. At this time, as shown in drawing 2 (D), the partitioning material 23 by which coating was carried out to the glass substrate 24 stops to the glass substrate 24, and Mother type 22 has the allocated type.

[0025]

[Effect of the Invention]As mentioned above, a septum type formation method which can manufacture the master mold which has a large area in precision shape by low cost with high precision [ it is defect-free and ] according to this invention, And it is the master mold base material, and the septum mold material with which accuracy very high about the predetermined size corresponding to the height of a septum is obtained is provided. According to the septum type formation method of the 2nd gestalt of this invention, the Mother type which comprises metallic materials, such as nickel which has intensity and endurance by the Mother type morphosis, can be obtained from a master mold. According to the septum type formation method of the 3rd gestalt of this invention, the accuracy whose die member obtained is very high about the predetermined size corresponding to the height of a septum is obtained.

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[Translation done.]

